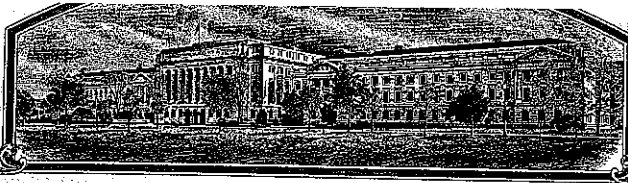


No.

9700389



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Texas Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

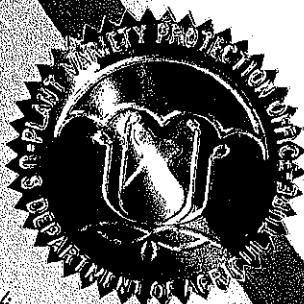
NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE FOREGOING PURPOSE, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT, COMMON

'TAM110'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this eighth day of May, in the year of our Lord two thousand one.

Attest:



*Acting Commissioner
Plant Variety Protection Office
Agricultural Marketing Service*

W. H. H. H. H.

Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE DIVISION - PLANT VARIETY PROTECTION OFFICE

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a).

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

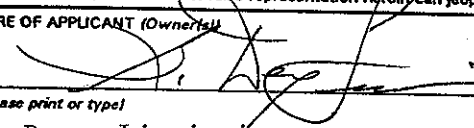
1. NAME OF APPLICANT(S) (as it is to appear on the Certificate)		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Texas Agricultural Experiment Station		TXGH12588-105	TAM110
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)		5. TELEPHONE (include area code)	FOR OFFICIAL USE ONLY PVPO NUMBER 9700385 DATE 12 August 1997 FILING AND EXAMINATION FEE \$2450.00 DATE 05/30/97 CERTIFICATION FEE \$320.00 DATE 12/5/00
Office of the Director 110 Administration Building College Station, TX 77843-2147		409/847-9325	
6. FAX (include area code)			
409/845-9938			
7. GENUS AND SPECIES NAME	8. FAMILY NAME (Botanical)		
Triticum aestivum	Poaceae		
9. CROP KIND NAME (Common name)			
Wheat			
10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (corporation, partnership, association, etc.) (Common name)			
Public Agricultural Research Agency of the State of Texas			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION		12. DATE OF INCORPORATION	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS			14. TELEPHONE (include area code)
Technology Licensing Manager Agriculture/Life Sciences 310 Wisenbaker College Station, TX 77843-3369			409/847-8682
			15. FAX (include area code)
			409/845-1402
16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)			
a. <input checked="" type="checkbox"/> Exhibit A. Origin and Breeding History of the Variety b. <input checked="" type="checkbox"/> Exhibit B. Statement of Distinctness see attached c. <input checked="" type="checkbox"/> Exhibit C. Objective Description of the Variety d. <input checked="" type="checkbox"/> Exhibit D. Additional Description of the Variety e. <input checked="" type="checkbox"/> Exhibit E. Statement of the Basis of the Applicant's Ownership see attached f. <input checked="" type="checkbox"/> Voucher Sample (2,500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in a public repository) g. <input checked="" type="checkbox"/> Filing and Examination Fee (\$2,450), made payable to "Treasurer of the United States" (Mail to PVPO)			
17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY, AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act?)			
<input checked="" type="checkbox"/> YES (If "yes," answer items 18 and 19 below) <input type="checkbox"/> NO (If "no," go to item 20)			
18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?		19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?	
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<input checked="" type="checkbox"/> FOUNDATION <input checked="" type="checkbox"/> REGISTERED <input checked="" type="checkbox"/> CERTIFIED	
20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?			
<input checked="" type="checkbox"/> YES (If "yes," give names of countries and dates) <input type="checkbox"/> NO			
Sept. 30 1996 in the United States, invoice attached.			
21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.			
The undersigned applicant(s) is(are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.			
Applicant(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.			
SIGNATURE OF APPLICANT (Owner(s))		SIGNATURE OF APPLICANT (Owner(s))	
			
NAME (Please print or type)		NAME (Please print or type)	
G. Dewey Liccioni			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Assistant Vice Chancellor	5 May 97		

Exhibit A

Origin and Breed History

The pedigree of the wheat (*Triticum aestivum* L. em. Thell) line TXGH12588-105 is (TAM105*4/Amigo)*5//Largo. TAM105 (CI 17826) was developed and released by the Texas Agricultural Experiment Station (TAES) as an improved variety of hard red winter wheat (HRWW) in 1997, and has the pedigree short wheat/Scout (1). The short wheat used in the cross included many experimental short statured wheats. TAM105 was selected in the F₅ from the progeny of a composite of F₂ seed from crosses of the short wheats with Scout. Amigo is a germplasm line containing a translocated chromosome (1AL: IRS) induced by X-irradiation of wheat x triticale F₁ hybrids (2). The rye portion of the translocated chromosome carries resistance to biotype C greenbug (*Schizaphis graminum* {Rondani}), resistance to stem rust. (*Puccinia graminis* Pers. f. sp. *tritici* Eriks and E. Henn.) and resistance to powdery mildew (*Erysiphe graminis* {D.C. *tritici* Em. Marchal}). Largo is an artificial amphiploid (2n = 6x = 42) from a cross of *Triticum turgidum*, cv. Langdon x *Triticum tauschii*, PI 268219 (3). Largo carries resistance to biotype E greenbug. The recurrent parent (TAM105*4/Amigo) is the selfed progeny of a single greenhouse plant grown in the winter of 1979-80 at Bushland and is a full sib to the cultivar TAM107, released by TAES in 1984 (4). The first cross to Largo was made in the greenhouse at Bushland in the winter of 1980-81, and backcrosses were made, also in the Bushland greenhouse, from 1981-1984. At each generation, selection was practiced by screening seedlings for survival after biotype-E greenbug infestation. Greenbugs were removed and survivors transplanted after the susceptible checks, TAM105 and TAM107 were dead. Thus, during each generation, one parent was always resistant to biotype E. F₃ plants were grown from the final backcross (BC₃) in the greenhouse at Bushland in the fall of 1984, and seeds were collected for each plant. The progeny of one of these was designated TXGH12588, and was found to segregate for resistance to biotype E. TXGH12588 was tested in intrastate nurseries for four years (Advanced 1 in 1986-87 and Wheat Elite in 1990-91). TXGH12588 was also tested for two years (1989 and 1990) in a uniform, interstate nursery, the Southern Regional Performance Nursery. About 400 individual plants from this line were grown in the greenhouse at Bushland during the spring of 1990, and crossed again with the recurrent parent. Progeny seeds of each BC₃ plant were harvested in June, 1990, and tested as previously described for resistance to biotype E greenbug. Approximately 45-50 BC₄ seeds were tested for each BC₃ plant, and, for those BC₃ plants which produced susceptible progeny, aphids were removed to permit the BC₄ seedlings to recover. About 20 BC₄ seedlings were grown to maturity for each of 52 BC₃ plants with no susceptible progeny, and the BC₄F₂ lines of each of the 52 groups were planted in the field at Bushland in February, 1991, and were evaluated visually for uniformity. Within each of the 52 groups, BC₄F₂ lines which produced no susceptible F₃ seedlings and were visually uniform were bulked to generate reselections of TXGH12588. Thirty-five reselections, including one designated TXGH12588-105, were evaluated in a replicated yield test at Bushland and Chillicothe in 1992. That reselection was tested for two years in a uniform, interstate nursery, the Western Plains Regional Performance Nursery (1994 and 1995). An initial increase of breeder seed of one-tenth acre was grown on USDA/ARS research

land at Bushland in 1993. Seed harvested was cleaned at the Texas Foundation Seed Service facility at Vernon and replanted on about two acres at Lockett in the fall of 1993. That field was rogued and harvested with a previously cleaned small-plot combine. A final 28-acre increase was grown at the TAES-Bushland facility in 1995 on land that had been fallow for one year and previously planted with sorghum in the summer of 1993. Approximately 500 bushels of TXGH12588-105 seed was harvested in June, 1995. Yield response, seed quality and agronomic characteristics were measured at multiple locations for four consecutive years (1992-95, see release proposal), assuring uniformity and stability of TXGH12588-105.

TXGH12588-105 is an awned semidwarf hard red winter wheat with red chaff. It may be grown in many areas of Texas, but has been shown to be best adapted to the High Plains region. The principal features of TXGH12588-105 are: (1) high yield; (2) biotype-E-greenbug resistance; (3) early maturity and (4) good, hard red winter wheat quality.

January 10, 1997

Release Proposal
Addendum

Proposal to Release TXGH12588-105 as an Improved Variety of Hard Red Winter Wheat

M.D. Lazar, W.D. Worrall, G.L. Peterson, K.B. Porter, L.W. Rooney, N.A. Tuleen,
D.S. Marshall, M.E. McDaniel and L.R. Nelson

Addendum

Description of Variants:

Expected variants in the wheat breeding line TXGH12588-105, recently released under the name, TAM 110, are as follows: Not more than 0.1% of heads are expected to be up to 2 head lengths above average canopy height. Not more than 0.1% of heads are expected to be white chaffed.

Exhibit B. Novelty Statement for TAM110

TAM110 is the product of five generations of crossing using a breeding line, pedigree TAM105*4/Amigo, as the recurrent parent and the germplasm line, Largo, as the nonrecurrent parent. TAM105 is a hard red winter wheat variety, and Amigo is a germplasm line. Segregating progeny of the crosses were selected on the basis of resistance to biotype E greenbug, *Schizaphis graminum* Rondani. A single BC₄ plant was selected on the basis of uniformity of resistance among its selfed progeny. TAM110 is unique among hard red winter wheat varieties for its resistance to biotypes E and I greenbug. TAM110 is most closely related to the variety TAM107 with respect to yield and agronomic characteristics. Tabular data attached, derived from the TAM110 release proposal, demonstrate the distinctions between TAM110 (tested as TXGH12588-105) and other adapted varieties. The principal distinction between TAM110 and TAM107 is in resistance to biotype E greenbug (Table 8). Yield and agronomic data presented are the means of 3 replicates for each variety at each location in each year. Each single plot contained about 1,200 plants.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (TRITICUM SPP.)

INSTRUCTIONS: See Reverse.

NAME OF APPLICANT(S): M.D. Lazar, W.D. Worrall, K.B. Porter, D.R. Marshall, L.R. Nelson, M.E. McDaniel, N.A. Tuleen	FOR OFFICIAL USE ONLY PVPO NUMBER 9700389
ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code) Texas Agricultural Experiment Station 6500 Amarillo Boulevard West Amarillo, TX 79106	VARIETY NAME OR TEMPORARY DESIGNATION TAM 110

Place the appropriate number that describes the varietal character of this variety in the boxes below.

Place a zero in first box (e.g., 0 8 9 or 0 9) when number is either 99 or less or 9 or less.

1. KIND:

1 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:

2 1 = SPRING 2 = WINTER 3 = OTHER (Specify) 1 = SOFT 3 = OTHER (Specify)
2 2 = HARD

2 1 = WHITE 2 = RED 3 = OTHER (Specify)

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:

1 2 7 FIRST FLOWERING 1 3 0 LAST FLOWERING

4. MATURITY (50% Flowering):

0 4 NO. OF DAYS EARLIER THAN 2 1 = ARTHUR 2 = SCOUT 3 = CHRIS
0 0 NO. OF DAYS LATER THAN TAM107 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT (From soil level to top of head):

0 6 0 CM. HIGH

0 1 CM. TALLER THAN TAM107

1 1 CM. SHORTER THAN 2 1 = ARTHUR 2 = SCOUT 3 = CHRIS
4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING (See reverse):

2 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHOR COLOR:

1 1 = YELLOW 2 = PURPLE

8. STEM:

2 Anthocyanin: 1 = ABSENT 2 = PRESENT

Waxy bloom: 1 = ABSENT 2 = PRESENT

2 Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT

1 Internodes: 1 = HOLLOW 2 = SOLID

0 5 NO. OF NODES (Originating from node above ground)

1 2 CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:

1 Anthocyanin: 1 = ABSENT 2 = PRESENT

1 Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:

1 Flag leaf at booting stage: 1 = ERECT 2 = RECURVED
3 = OTHER (Specify)

1 Flag leaf: 1 = NOT TWISTED 2 = TWISTED

1 Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT

Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT

0 7 MM. LEAF WIDTH (First leaf below flag leaf)

1 0 CM. LEAF LENGTH (First leaf below flag leaf)

11. HEAD:

☐ 2 Density: 1 = LAX 2 = DENSE ☐ 1 Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE
 4 = OTHER (Specify) _____
☐ 4 Awedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNEO
☐ 4 Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED
 5 = BROWN 6 = BLACK 7 = OTHER (Specify) _____
☐ 0 ☐ 7 CM. LENGTH ☐ 1 ☐ 1 MM. WIDTH

12. GLUMES AT MATURITY:

☐ 2 Length: 1 = SHORT (CA. 7 mm.) 2 = MEDIUM (CA. 8 mm.) 3 = LONG (CA. 9 mm.) ☐ 2 Width: 1 = NARROW (CA. 3 mm.) 2 = MEDIUM (CA. 3.5 mm.)
 3 = WIDE (CA. 4 mm.)

☐ 2 Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE ☐ 3 Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

☐ 1 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

☐ 1 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

☐ 2 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

☐ 3 Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL ☐ 2 Check: 1 = ROUNDED 2 = ANGULAR
☐ 2 Brush: 1 = SHORT 2 = MEDIUM 3 = LONG ☐ 1 Brush: 1 = NOT COLLARED 2 = COLLARED
☐ Phenol reaction (See Instructions): 1 = IVORY 2 = FAWN 3 = LT. BROWN
 4 = BROWN 5 = BLACK
☐ 3 Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER (Specify) _____
☐ 0 ☐ 7 MM. LENGTH ☐ 0 ☐ 3 MM. WIDTH ☐ GM. PER 1000 SEEDS

17. SEED CREASE:

☐ 1 Width: 1 = 60% OR LESS OF KERNEL 'WINOKA'
 2 = 80% OR LESS OF KERNEL 'CHRIS'
 3 = NEARLY AS WIDE AS KERNEL 'LENNI'
☐ 1 Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT'
 2 = 35% OR LESS OF KERNEL 'CHRIS'
 3 = 50% OR LESS OF KERNEL 'LENNI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 2 STEM RUST (Race) ☐ 1 LEAF RUST (Race) ☐ 0 STRIPE RUST (Race) ☐ 0 LOOSE SMUT
☐ 2 POWDERY MILDEW ☐ 0 BUNT ☐ OTHER (Specify) _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

☐ 0 SAWFLY ☐ 0 APHID (Bydv.) ☐ 2 GREEN BUG ☐ 0 CEREAL LEAF BEETLE
☐ OTHER (Specify) _____ HESSIAN FLY RACES: ☐ GP ☐ A ☐ B ☐ C
☐ D ☐ E ☐ F ☐ G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	TAM107	Seed size	TAM107
Leaf size	TAM107	Seed shape	TAM107
Leaf color	TAM107	Coleoptile elongation	TAM107
Leaf carriage	TAM107	Seedling pigmentation	TAM107

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.V. Briggie and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) V.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. (See attachment.)

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

9700389

Exhibit D.
Additional Description of TAM110

Table 1. Yield (bu/A) and rank^a (in parentheses) of TXGH12588 and other lines grown in the 1989 and 1990 SRPN.

Crop Year	Cultivar or Selection	Bush ^b		Clov		Burl		Gdwl		Hays		Chil		Regional Mean
		dry	irr	dry	irr	dry	irr	dry	irr	dry	irr	dry	irr	
1989	TXGH12588	-	-	58.6(1)	77.9(7)	65.5(2)	70.4(1)	20.5(1)	21.7(37)	20.5(1)	21.7(37)	20.5(1)	21.7(37)	53.4(4)
	TX86V1405 ^c	-	-	26.7(23)	55.0(41)	58.0(23)	65.1(4)	17.4(6)	20.9(43)	17.4(6)	20.9(43)	17.4(6)	20.9(43)	49.3(15)
	TAM105	-	-	28.2(17)	93.0(1)	60.0(16)	59.3(12)	18.6(3)	25.5(7)	18.6(3)	25.5(7)	18.6(3)	25.5(7)	50.7(9)
	Scout 66	-	-	18.9(34)	71.6(14)	58.2(22)	50.0(28)	15.4(15)	25.7(6)	15.4(15)	25.7(6)	15.4(15)	25.7(6)	43.8(38)
	Kharkov	-	-	16.9(36)	57.3(38)	54.9(35)	34.4(41)	15.3(16)	17.1(45)	15.3(16)	17.1(45)	15.3(16)	17.1(45)	37.8(43)
	LSD (.05)	-	-	16.1	13.4	8.9	18.1	3.6	3.8	3.6	3.8	3.6	3.8	4.2
1990	TXGH12588	21.7(15)	103.9(3)	23.8(1)	102.9(3)	60.4(2)	81.7(2)	65.0(12)	67.9(6)	65.0(12)	67.9(6)	65.0(12)	67.9(6)	52.6(6)
	TX8V1405 ^c	25.9(1)	99.4(7)	16.3(5)	91.2(8)	65.4(1)	72.8(15)	69.3(3)	67.0(9)	69.3(3)	67.0(9)	69.3(3)	67.0(9)	55.6(1)
	TAM105	17.5(31)	88.3(20)	14.7(8)	104.4(1)	47.1(25)	82.5(1)	64.2(14)	50.4(34)	64.2(14)	50.4(34)	64.2(14)	50.4(34)	46.9(30)
	TAM107	24.5(7)	99.5(6)	17.2(3)	103.3(2)	49.4(18)	79.1(5)	67.6(17)	64.8(15)	67.6(17)	64.8(15)	67.6(17)	64.8(15)	51.5(13)
	Scout 66	16.8(34)	58.4(37)	20.4(2)	70.0(34)	47.2(24)	66.9(22)	54.9(34)	48.7(36)	54.9(34)	48.7(36)	54.9(34)	48.7(36)	39.7(36)
	Kharkov	9.0(38)	49.0(38)	8.1(33)	49.3(38)	32.2(38)	45.6(38)	39.4(38)	27.4(38)	39.4(38)	27.4(38)	39.4(38)	27.4(38)	29.5(38)
	LSD (.05)	8.8	6.9	NS ^d	12.2	10.4	5.3	6.4	9.4	6.4	9.4	6.4	9.4	4.0

^aRank out of 45 total entries in 1989 and 38 total entries in 1990.^bLocations are Bush=Bushland, TX; Clov=Clovis, NM; Burl = Burlington, CO; Gdwl = Goodwell, OK; Hays = Hays, KS; Chil = Chillicothe, TX; 'dry' indicates a dryland test site and 'irr' indicates an irrigated test site. Due to hail, no data were collected at Bushland in 1989. No Burlington data were available in 1990, so Akron, CO data were substituted.^cTX86V1405 was later released by TAES as TAM202.^dNS = means not significantly different by LSD (P=0.05).

9700389

Release Proposal

Table 2. Yield (bu/A) of TXGH12588 and released cultivars in 1990 and 1991 in the Texas Elite Nursery at two Bushland, TX sites.

Cultivar or Selection	Dryland		Irrigated	
	1990	1991	1990	1991
TXGH12588	23.1	40.8	103.8	107.1
Chisholm	20.7	29.2	101.3	100.7
Cimmaron	21.7	34.9	90.7	95.5
Collin	18.3	24.6	88.5	91.0
Karl	16.7	22.0	85.9	90.1
Mesa	22.8	29.4	96.6	90.8
Quantum 588	19.1	30.0	108.3	118.6
Quantum 589	18.6	30.4	102.6	113.4
Siouxland 89	17.1	39.2	77.9	92.7
TAM-W101	17.8	26.5	98.1	93.0
TAM-105	17.7	40.3	99.1	100.5
TAM-107	21.2	43.6	101.9	104.3
TAM-200	20.2	38.2	115.8	110.2
TAM-201	21.4	27.2	115.1	98.1
TAM-202	23.0	36.5	100.5	101.1
Thunderbird	18.9	26.9	79.3	91.1
2163	18.0	24.6	84.3	91.1
2180	19.5	33.7	107.3	101.5
LSD (.05)		8.3		8.5

Table 3. Yield (bu/A) of TXGH12588-105 and check cultivars at two locations in 1992.

Cultivar or Selection	Bushland	Chillicothe
TXGH12588-105	45.0	49.4
Siouxland 89	40.3	47.7
TAM-W101	40.7	42.0
TAM-107	44.1	40.4
TAM-200	44.0	40.1
TXGH12588R ^a	41.7	46.8
LSD (.05)	4.8	10.2

^aTXGH12588R consists of equal parts of all biotype-E-resistant reselections of TXGH12588.

9700389

Release Proposal

Table 4. Yield (bu/A) and rank^a (in parentheses) of TXGH12588-26, TXGH12588-105, TXGH12588-120 and check cultivars in 1993-94 and 1994-95 WPRPN.

Crop Year	Cultivar of Selection	Bush ^b	Clby	Gdwl	Akm	Arch	Scot	Pier	Regional Mean
1994	TXGH12588-26	36.2(14)	56.3(4)	39.0(1)	31.5(25)	19.4(11)	40.5(16)	NA	37.1(8)
	TXGH12588-105	33.3(20)	54.5(6)	33.8(10)	38.3(9)	18.2(17)	41.4(12)	NA	36.6(9)
	TXGH12588-120	32.5(22)	59.5(1)	37.8(2)	41.7(2)	19.1(13)	40.0(20)	NA	38.4(3)
	Arapahoe	35.2(16)	47.6(23)	32.4(15)	26.6(30)	12.4(31)	38.0(24)	NA	32.0(26)
	Lamar	41.3(6)	47.5(24)	30.4(21)	34.1(20)	20.1(7)	45.1(3)	NA	35.0(18)
	Larned	38.2(11)	48.1(20)	33.1(13)	33.6(22)	16.1(24)	43.6(6)	NA	35.4(16)
	Siouxland	32.1(23)	49.0(18)	33.1(14)	36.4(14)	16.0(25)	39.4(22)	NA	34.3(21)
	LSD (.05)	4.3	6.5	N.S. ^c	N.S.	3.1	4.3	NA	4.1
1995	TXGH12588-26	10.4(24)	48.0(18)	NA ^d	51.9(21)	NA	42.8(13)	54.6(1)	41.5(16)
	TXGH12588-105	10.3(25)	50.6(14)	NA	54.0(19)	NA	39.4(20)	51.2(2)	41.1(18)
	TXGH12588-120	8.5(27)	43.4(24)	NA	48.1(24)	NA	39.7(19)	38.2(17)	35.5(24)
	Arapahoe	13.9(23)	60.6(5)	NA	76.5(3)	NA	45.5(7)	34.9(20)	46.3(9)
	Lamar	21.0(13)	52.8(12)	NA	59.7(14)	NA	43.9(11)	28.5(24)	41.3(17)
	Larned	14.0(23)	46.1(21)	NA	47.9(25)	NA	35.1(27)	33.5(21)	35.3(25)
	Siouxland	14.8(21)	43.4(24)	NA	64.9(12)	NA	40.8(18)	31.9(23)	39.2(19)
	LSD (.05)	5.0	6.1	NA	10.5	NA	5.7	15.6	8.6

^aRank out of a total of 31 entries in 1994 and 28 entries in 1995.

^bLocations are Bush=Bushland, TX; Clby=Colby, KS; Gdwl=Goodwell, OK; Akm=Akron, CO; Arch=Archer, WY; Scot=Scottsbluff, NE; Pier=Pierre, SD.

^cN.S. = no significant differences among means by LSD (P=0.05).

^dNA = not available.

Table 5. Maturity (days to heading from 1/1) and height (inches) for TXGH12588-105 and check cultivars in two years in the WPRPN.

Cultivar or Selection	Mean Maturity ^a		Mean Plant Height ^a	
	1994	1995	1994	1995
TXGH12588-105	137	133	24	23
Arapahoe	144	148	26	27
Lamar	141	144	27	28
Larned	139	140	28	31
Siouxland	141	143	28	30

^aMeans over all locations noted in Table 4.

9700389

Release Proposal

Table 6. Agronomic characteristics of TXGH12588-105 and other cultivars in tests at two Texas locations in 1992 and 1995.

Cultivar or Selection	Mean Height ^a			Mean Maturity ^a			Lodging ^a	
	1992		1995		1992		1995	
	Bush(d) ^b	Chil.	Bush(d)	Bush(i)	Bush(d) ^b	Chil.	Bush(i)	Bush(i)
TXGH12588-105	28	30	18	29	113	102	116	18
TAM105	-	-	18	30	-	-	122	5
TAM107	27	29	17	28	113	101	115	2
TAM200	24	26	16	27	120	107	119	19
TAM201	-	-	16	26	-	-	116	0
TAM202	-	-	16	28	-	-	117	6
Karl 92	-	-	16	28	-	-	119	4
Larned	-	-	18	33	-	-	123	31
Siouxland 89	29	34	20	34	124	113	125	16
Thunderbird	-	-	19	34	-	-	123	2
2180	-	-	15	27	-	-	115	0

^aData are height (inches) at maturity, maturity (days from January 1 to heading) and lodging (percent-indicating degree of leaning).

^bLocations were Bushland (dryland): Bush(d), Bushland(irrigated): Bush(i) and Chillicothe (Chil).

Table 7. Test weights (lb/bu) of TXGH12588-105 and check cultivars in two years in the WPRPN.

Cultivar or Selection	Mean Test Weight ¹	
	1994	1995
TXGH12588-105	57.5	59.9
Arapahoe	56.3	59.2
Lamar	59.4	60.1
Larned	58.2	59.3
Siouxland	57.4	58.4
LSD (.05)	0.8	0.7

¹Means over all locations noted in Table 4.

Table 8. Survival of seedlings of TXGH12588-105 and several varieties after artificial infestation with greenbug^a.

Cultivar or Selection	Biotype C ^b	Biotype E ^b	1995 Bushland Isolate ^b
TXGH12588-105	60/60 ^c	59/59	60/60
TXGH12588	60/60	38/60	35/59
Century	59/59	0/60	0/60
Chisholm	0/60	0/60	0/59
Karl	0/59	0/60	0/60
Largo ^d	60/60	49/60	51/60
Siouxland 89	60/60	0/60	0/59
TAMW101	0/59	0/60	0/60
TAM105	0/60	0/60	0/60
TAM107	60/60	0/60	0/60
TAM200	60/60	0/59	0/60
TAM202	59/60	0/60	0/59
Thunderbird	0/60	0/60	0/60
2180	0/60	0/60	0/60

^aGreenbug infestations were carried out in replicated flats at the two-leaf stage, using about 3 apterous, adult aphids per seedling under artificial lighting with a 12 hr. photoperiod and day/night temperatures of 70/62°F.

^bEach biotype or isolate was kept in a separate, physically isolated chamber to prevent aphid movement. The 1995 Bushland isolate was a composite of greenbugs collected at four locations near Bushland.

^cData are (number of surviving seedlings)/(number of total seedlings) and are the sum of data from two separate experiments.

^dLargo is a germplasm line (4) originally selected on the basis of biotype C resistance, but later determined to possess, non-uniformly, biotype E resistance.

9700389

Release Proposal

Table 9. Wheat curl mite (Barton strain) numbers grown on several wheat genotypes.^a

Cultivar or Selection	Greenbug Resistance Reaction		Mean Number of Mites
	Biotype C	Biotype E	
TXGH12588-105	R	R	2.4
TXGH12588-281	R	S	47.8
TXGH12588-285	R	R	3.4
TXGH12588-307	R	S	0.6
TAM107	R	S	4.4
Tomahawk	S	S	45.6

^aCurl mite resistance was kindly assessed by Dr. T.L. Harvey, Kansas State University, Hays, KS. Wheat was infested at the two-leaf stage with five mites per plant and numbers of mites were scored one week later.

Table 10. Seedling reactions of TXGH12588-105 to selected isolates of stem rust and leaf rust.^a

Stem Rust		Leaf Rust	
Isolate	Reaction	Isolate	Reaction
74-14-504C-RPQQ	2=	CLBN	S
75-32-1662A-RTQS	2=	TCBJ	S
76-00-118B-RTQQ	;1	PLML	S
70-21-528A-QFBS	1	PBDL	S
71-00-24C-QSHS	2=	MGBN	S
76-14-396A-TNMH	2=	CDBN	S
76-21-833B-TNMK	2=	TDBN	S
76-21-702C-RKQS	2=		
Postulated stem rust resistance gene	Amigo	Postulated leaf rust resistance gene	none

^aRust resistance reactions and assessments were performed by D.V. McVey, USDA-ARS, Cereal Rust Laboratory, St. Paul, MN.

Table 11. Physical characteristics of several wheat lines grown at Bushland in 1992.^a

Variety or Selection	Bushel Weight (lb/Bu)	1000 Kernel Weight (g)	Hardness Score ^b		
			SKWCS ^d	NIR	Millers Subjective
TAM W-101	56.4	27.2	68	47 Q	5
TAM 200	59.0	19.8 Q-U	59	40 U	4 Q
Siouxland 89	56.5	23.0	73	49 Q	6
TXGH12588-7	55.1	23.6	72	59	6
TXGH12588-41	56.1	24.4	73	61	6
TXGH12588-76	54.7	21.7	69	55	5
TXGH12588-99	56.0	24.4	66	60	6
TXGH12588-114	56.7	24.4	70	71	6
TXGH12588-136	57.4	26.7	67	70	6
TXGH12588-145	56.5	24.2	73	56	6
TXGH12588-26	55.8	24.9	71	54	6
TXGH12588-102	55.0	22.5	71	57	5
TXGH12588-105	57.0	24.7	71	66	6
TXGH12588-120	55.9	24.2	66	59	6
TXGH12588-R	55.8	23.6	67	59	6
Mean	56.3	24.0	69	58	5.7
(sd) ^c	(1.1)	(1.8)	(4)	(8)	(0.6)

^aS, Q, U = satisfactory, questionable, and unsatisfactory quality in respect to property in question. A satisfactory rating is inferred in the absence of a designated one. Analyses were performed by Dr. O.K. Chung, Cereal Quality Laboratory, USDA/ARS, Manhattan, KS.

^bWheat hardness scores were determined by NIR (New Infra Red Analyzer: Dickey John, Instalab 600) of bulk samples and by the USGMRL-SKWCS of each kernel: the higher the value, the harder the wheat sample. Miller's Subjective Scores: 1-3 - too soft, unacceptable for hard wheat milling; 4-7 - acceptable for hard wheat milling (4 - softer than average; 5-7 - average); 8-10 - harder than average, would lengthen grinding time and could cause reduction in flour quality.

^csd = standard deviation.

^dSKWCS > single kernel wheat characterization system.

9700389

Release Proposal

Table 12. Chemical, milling, and mixograph data for several wheat lines grown at Bushland in 1992.^{a,b}

Variety or Selection	Wheat			Flour			Mixograph	
	Ash (%)	NIR Protein (%)	Flour Yield (%)	Milling Score ^c	Ash (%)	NIR Protein (%)	Color Value ^d	Mix Time ^e As Is (min)
TAM W-101	1.37	15.0	68.9	83	0.46	14.4	78	3.50
TAM 200	1.37	15.2	65.8 U	81	0.42	14.5	83	4.38
Siouxland 89	1.48	15.2	70.1	86	0.47	14.5	78	4.00
TXGH12588-7	1.43	15.3	69.7	88	0.43	14.5	76	4.50
TXGH12588-41	1.44	15.9	69.3	86	0.42	15.0	75	5.38
TXGH12588-76	1.54	15.3	68.8	88	0.45	14.4	76	6.00
TXGH12588-99	1.56	15.2	70.8	90	0.46	14.6	74	4.63
TXGH12588-114	1.42	16.7	70.6	84	0.45	15.7	72	4.38
TXGH12588-136	1.48	16.0	71.8	88	0.43	15.2	73	4.00
TXGH12588-145	1.33	13.8	70.0	89	0.42	13.3	77	5.00
TXGH12588-26	1.31	13.3	69.1	89	0.40	12.8	79	5.75
TXGH12588-102	1.44	15.4	68.1	89	0.39	14.5	75	5.38
TXGH12588-105	1.39	16.2	69.9	85	0.42	15.2	74	5.50
TXGH12588-120	1.32	14.2	69.2	88	0.40	13.5	78	5.38
TXGH12588-R	1.38	15.3	71.3	88	0.42	14.4	75	5.13
Mean	1.42	15.2	69.6	87	0.43	14.4	76	4.86
(sd) ^f	(0.08)	(0.9)	(1.4)	(3)	(0.02)	(0.8)	(2.8)	(0.73)
								3.9
								(0.5)

^aData expressed on a 14% moisture basis.^bO, E, S, Q, and U = outstanding, excellent, satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfactory rating is inferred in the absence of a designated one. One unsatisfactory rating characterizes a variety as undesirable for hard winter wheat milling and bread making purposes. Analyses performed by Dr. O.K. Chung, Cereal Quality Laboratory, USDA/ARS, Manhattan, K.S.^cMilling scores (MS) were derived from test weight (TW), flour yield (FY), and the ash and protein conversions. MS = 100 - ((TW - 60) + (82 - FY) + 100 (FA - WA/3.9) + 10 ((WP - 1) - FP)). FA = flour ash; WA = wheat ash; FP = flour protein; WP = wheat protein.^dColor values were obtained by an Agtron Photoelectric Colorimeter with a modified method (AACC Method 14-30) using flour samples rather than using slurry samples with Agtron certified calibration disks "63" for 0% setting and "97" instead of "85" for 100% setting.^eMixing times for samples having less than 12% protein would have been corrected to 12% protein. Since protein contents of all flours were higher than 12%, there was no need for correction.^fMixing tolerance was rated with numbers: 6 for Q; 5 for E; 4 for S; 3 for S-Q; 2 for Q; 1 for Q-U; and 0 for U.^gsd = standard deviation.

Table 13. Bread-making data for several wheat lines grown at Bushland in 1992.^{a,b}

Variety or Selection	Dough			Loaf volume		
	Absorption %	Mix Time ^c As Is (min)	Proof Height (cm)	Crumb Grain ^d	As Rec'd (cc)	Sp. Vol. ^e (cc/g)
TAM W-101	70.2	4.88	7.6	4 (SY)	1033	6.7
TAM 200	72.6	7.50 Q	7.7	2 Q (Y)	1155	7.5
Stouland 89	67.4	5.25	8.1	4 (Y)	1020	6.7
TXGH12588-7	74.4	6.75	7.4	3 (Y)	1043	6.6
TXGH12588-41	81.4	6.63	7.4	3 (Y)	1093	7.1
TXGH12588-76	76.1	7.50 Q	7.4	3 (Y)	1075	6.9
TXGH12588-99	80.5	6.38	7.2	3 (Y)	1015	6.6
TXGH12588-114	74.3	5.25	7.6	0 U (Y)	1070	7.0
TXGH12588-136	75.2	5.50	7.6	1 Q-U (Y)	1075	7.0
TXGH12588-145	72.2	8.00 Q-U	7.2	2 Q (Y)	1028	6.7
TXGH12588-26	73.8	7.75 Q	7.1 Q	3 (Y)	983	6.3
TXGH12588-102	78.7	7.38	7.3	3 (Y)	1050	6.8
TXGH12588-105	79.8	6.50	7.4	3 (Y)	1070	6.9
TXGH12588-120	77.3 Q	7.75 Q	7.1 Q	2 Q (Y)	958	6.2
TXGH12588-R	80.3	7.75 Q	7.4	2 Q (Y)	1043	6.6
Mean	75.6	6.72	7.4	2.5	1047	6.8
(sd) ^f	(4.1)	(1.06)	(0.3)	(1.1)	(47)	(0.3)

^aData expressed on a 14% moisture basis.^bO, E, S, Q, and U = outstanding, excellent, satisfactory, questionable, and unsatisfactory quality with respect to property in question. A satisfactory rating is inferred in the absence of a designated one. One unsatisfactory rating characterizes a variety as undesirable for hard winter wheat milling and bread making purposes. Analyses were performed by Dr. O.K. Chung, Cereal Quality Laboratory, USDA/ARS, Manhattan, KS.^cMixing times for samples having less than 12% protein would have been corrected to 12% protein. Since protein contents of all flours were higher than 12%, there was no need for correction.^dCrumb grain was rated with numbers: 6 for O; 5 for E; 4 for S; 3 for Q-S; 2 for Q; 1 for Q-U; and 0 for U. (SY) = slightly yellow; (Y) = yellow.^eSp. Vol. = specific volume (loaf volume/loaf weight).^fsd = standard deviation.

Exhibit E. Statement of the Basis of Applicant's Ownership

TAM110 is owned by the Texas Agricultural Experiment Station, since unique and novel selections were made by TAES personnel at TAES facilities at Amarillo, Texas. All selection and testing was conducted under the direction of TAES personnel. Initial production of breeder seed was conducted by TAES personnel at TAES facilities.

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) TAES		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER TXGH12588-105	3. VARIETY NAME TAM 110
4. ADDRESS (Street and No., or R.F.D. No., City, State, and ZIP Code, and Country) Room 110 Administration Building, College Station, TX 77843-2147		5. TELEPHONE (include area code) (409)847-8682	6. FAX (include area code) (409)845-1402
		7. PVPO NUMBER 9700389	
8. Does the applicant own all rights to the variety? Mark an "X" in appropriate block. If no, please explain. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
9. Is the applicant (individual or company) a U.S. national or U.S. based company? If no, give name of country <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
10. Is the applicant the original owner? <input type="checkbox"/> YES <input type="checkbox"/> NO If no, please answer the following:			
a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)? <input type="checkbox"/> YES <input type="checkbox"/> NO If no, give name of country			
b. If original rights to variety were owned by a company, is the original owner(s) a U.S. based company? <input type="checkbox"/> YES <input type="checkbox"/> NO If no, give name of country			
11. Additional explanation on ownership (if needed, use reverse for extra space):			

TAES policy and handbook manual provide that all germplasm and varieties developed by its employees in the course of their duties are own by TAES.
A copy of this policy is provided for your records.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0581-0055. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (braille, large print, audiotape, etc.) should contact the USDA Office of Communications at (202) 720-5881 (voice) or (202) 720-7808 (TDD).

To file a complaint, write the Secretary of Agriculture, U.S. Department of Agriculture, Washington, D.C. 20250, or call 1-800-245-6340 (voice) or (202) 720-1127 (TDD). USDA is an equal employment opportunity employer.